



# Naval Medical Research and Development

## *Enterprise Laboratories*

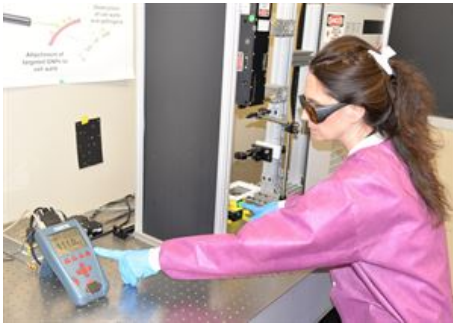
[Home](#)[Leadership](#)[Laboratories](#)[Collaboration](#)[News & Media](#)[Resources](#)

## News Releases

### NAMRU-SA Researchers Working on Laser Therapy Project to Improve Treatment of Multi-Drug Resistant Wound Infections

Released: 7/6/2017

By: David DeKunder, 502nd Air Base Wing Public Affairs



Dr. Nancy Millenbaugh, research chemist and principal investigator, Craniofacial Health and Restorative Medicine Directorate, Naval Medical Research Unit San Antonio, points to a laser beam that is used in testing the effectiveness of nanoparticle targeted laser therapy in improving the treatment of multi-drug resistant wound infections. (Photo by David Dekunder)

SAN ANTONIO – An innovative project being conducted at the Naval Medical Research Unit San Antonio (NAMRU-SA) could lead to the development of laser therapy technology to improve the treatment of antibiotic resistant wound infections in injured warfighters.

Dr. Nancy Millenbaugh, research chemist and principal investigator, Craniofacial Health and Restorative Medicine Directorate, NAMRU-SA, is using laser therapy to enhance the treatment of maxillofacial (mouth and jaw) wound infections.

She is studying the effectiveness of nanoparticle-targeted laser therapy to weaken bacteria in wounds that contain biofilms – a protective coating –making infections highly resistant to antibiotics. Biofilm infections in wounds can lead to extended hospital stays, delayed healing, scarring, loss of man-power, and in some cases death.

“Eighty percent of all infections in the body are linked to chronic wounds with biofilms covering them,” said Millenbaugh. “The battlefield is a place where wound infections, resistant to antibiotic treatment, are able to form because of adverse conditions, including contaminants from the ground, clothing, wood and other organisms.”

Millenbaugh’s team has performed experimental gold nanoparticle (GNP) laser therapy to break up biofilms which involves growing samples of biofilms on a culture plate, allowing the GNP’s to

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incubate and attach to the bacteria. Once attached to the bacteria or biofilm; it is then exposed to a pulsed laser.

“The GNP heats up very rapidly, very high on the surface close to the bacteria or biofilm,” said Millenaugh. “This causes thermal damage to any components it is in contact with. It’s going to breakdown the bacterial cell and biofilm and disperses it. It is basically blasting it apart. Once the biofilm is broken down or dispersed, an antibiotic or other drug can penetrate and get through to the bacteria and treat the wound infection,” she continued.

“Severely wounded service members who have chronic wounds due to multi-drug resistance and biofilms could really benefit from this,” said Millenbaugh. “This could enhance the treatment they receive, in addition to shortening their recovery time.”

Millenbaugh said any laser therapy treatment developed would need approval from the Federal Drug Administration (FDA) before it can be used on patients. She anticipates it could take 10 to 15 years of research to get FDA approval.

NAMRU-SA’s mission is focused on ways to enhance the health, safety, performance, and operational readiness of Navy and Marine Corps personnel and addresses their emergent medical and dental problems in routine and combat operations.

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[NAMRU-D Showcases Scientific Skill to Navy Medicine West Leadership](#)

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[About US](#)

**Laboratories**  
[NMRC](#)  
[NHRC](#)  
[NSMRL](#)  
[NAMRU-D](#)  
[NAMRU-SA](#)  
[NMRC-Asia](#)  
[NAMRU-3](#)  
[NAMRU-6](#)

**Collaboration**  
[Working With Us](#)  
[Partnerships](#)  
[Research Services](#)  
[Naval Research](#)  
[Business Contacts](#)

**News**  
[News & Media](#)  
[News](#)  
[Releases](#)  
[Fact Sheets](#)  
[Newsletters](#)  
[Media](#)  
[Inquiries](#)

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[Gorgas/WRAIR](#)  
[Library](#)  
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[MHS](#)  
[NSC](#)  
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